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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/965,630	09/27/2001	Jason K. Shiepe	PES-0043	2487
23462	7590	06/20/2005	EXAMINER	
CANTOR COLBURN, LLP 55 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002			CREPEAU, JONATHAN	
			ART UNIT	PAPER NUMBER
			1746	
DATE MAILED: 06/20/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/965,630

Applicant(s)

SHIEPE ET AL.

Examiner

Jonathan S. Crepeau

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 06 June 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 2,5-10,15-25,51,56 and 57 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2,5-10,15-25,51,56 and 57 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Amendment***

1. This Office action addresses claims 2, 5-10, 15-25, 51, 56, and 57 after entry of the amendment filed on June 6, 2005. A new ground of rejection has been applied to some of the claims herein (specifically, the use of WO 00/39363 instead of US 2001/0008722). As such, prosecution is reopened and this action is non-final.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 25 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 25 recites "wherein each of the porous supports is integrated with an elastomeric material selected from the group consisting of copper....". This recitation does not appear to be correct and should be amended.

***Claim Rejections - 35 USC § 103***

4. Claim 56 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 97/13287 in view of WO 00/39363 (Speranza et al).

WO '287 teaches a fuel cell comprising first and second electrodes, an electrolyte membrane, first and second flow fields (17), and porous flow field members (16) in fluid communication with the flow fields (see Figs. 2 and 8). The member comprises a porous support modified to provide hydrophilicity or hydrophobicity. The support can be made of electrically conductive carbon cloth and a polymer (i.e., PTFE or ion exchange resin) (page 12, line 1 et seq.). The member comprises two layers (18, 16), each having a different porosity (see col. 10, line 32 et seq.).

However, the reference does not expressly teach that the flow field members comprise an electrically conductive material selected from the group consisting of Nb, Zr, Ta, Ti, Co, and mixtures and alloys thereof.

Speranza et al. is directed to a screen/frame assembly for an electrochemical cell. The screen functions as a gas diffusion member and is made of Nb, Ni, Co, Zr, Ti, steel, or Ti.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the screen of Speranza et al. in the flow field member of WO '287. At page 2, line 30, Speranza et al. teach that "what is needed in the art is an improved screen assembly which provides structural integrity and simplified cell assembly while maintaining or improving the cell's mass flow

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characteristics.” As such, the artisan would be sufficiently motivated to use the screen of Speranza et al. in the flow field member of WO ‘287.

5. Claims 2, 5-10, 18-21 and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fuglevand (U.S. Patent 6,030,718) in view of Wilson (U.S. Patent 5,641,586) and Speranza et al.

Fuglevand teaches a fuel cell comprising first and second electrodes (160), an electrolyte membrane (151), first and second flow fields, and porous flow field members (171, 172) in fluid communication with the flow fields (see Fig. 26). The member comprises a porous support having a series of layers (in layer 171) having a hydrophilicity gradient (see col.11, line 8). Layer 171 comprises particulate carbon and a hydrophobic polymer (e.g., PTFE) and/or a hydrophilic polymer (e.g., ionomer) and layer 172 comprises a carbon cloth integrated with polymer (see col. 9, line 42, col. 9, line 52, col. 10, line 66). Layer 171 comprises 20-90% of support material (i.e., particulate carbon).

Fuglevand does not expressly teach that the porous supports comprise metal screens or sintered metal cloths, as recited in claim 21, or that such supports are made of Nb, Zr, Ta, Ti, steel, Ni, Co, and mixtures and alloys thereof (claim 8).

Wilson et al. teach a fuel cell comprising first and second electrodes, an electrolyte membrane, first and second flow fields (12), and a porous flow field member (24) in fluid

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communication with the first flow field (see Fig. 1B). The member comprises a porous support modified to provide hydrophilicity or hydrophobicity (see col. 4, line 46 et seq). The porous support may comprise sintered particles, woven metal screens (cloths), and non-woven metal screens (see col. 5, line 10).

Therefore, the artisan would be motivated to use the structures of Wilson '586 in the fuel cell of Fuglevand because the disclosure of Wilson '586 indicates that metal screens and cloths are functionally equivalent to carbon cloths when used in porous current-collecting members for fuel cells. As such, it would be obvious to substitute the metal screens or cloths of Wilson '586 for the carbon paper of Fuglevand. An express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982); MPEP §2144.06.

Wilson does not expressly teach that the support is a sintered metal cloth. However, the artisan would be motivated to sinter the metal cloth of Wilson '586. Such a sintering step would serve to increase the structural integrity of the cloth because the fibers would be fused together. Further, as noted above, Wilson '586 teaches "sintered particles," therefore fairly suggesting such a sintering step.

Wilson further does not expressly teach that the flow field members comprise an electrically conductive material selected from the group consisting of Nb, Zr, Ta, Ti, steel, Ni, Co, and mixtures and alloys thereof.

Speranza et al. is directed to a screen/frame assembly for an electrochemical cell. The screen functions as a gas diffusion member and is made of Nb, Ni, Co, Zr, Ti, steel, or Ti.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the materials of Speranza et al. in the flow field members of Wilson. The disclosure of Speranza et al. indicates that Nb, Ni, Co, Zr, Ti, steel, or Ti. are suitable materials for use as flow field members. The selection of a known material based on its suitability for its intended use has generally been held to be *prima facie* obvious (MPEP §2144.07). As such, it would be obvious to use the materials of Speranza in the flow field member of Wilson (and thus Fuglevand).

6. Claims 15, 22-25 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fuglevand in view of WO '287.

Fuglevand teaches a fuel cell comprising first and second electrodes (160), an electrolyte membrane (151), first and second flow fields, and porous flow field members (171, 172) in fluid communication with the flow fields (see Fig. 26). The member comprises a porous support having a series of layers (in layer 171) having a hydrophilicity gradient (see col.11, line 8). Layer 171 comprises particulate carbon and a hydrophobic polymer (e.g., PTFE) and/or a hydrophilic polymer (e.g., ionomer) and layer 172 comprises a carbon cloth integrated with polymer (see col. 9, line 42, col. 9, line 52, col. 10, line 66). Layer 171 comprises 20-90% of support material (i.e., particulate carbon). The reference further teaches that the layer 171

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comprises a plurality of layers but does not expressly teach that the layers each have a different porosity, as recited in claims 15, 22 and 51.

WO '287 teaches a flow field member having two layers having different porosity, as set forth above. Further, the reference teaches that the supports may comprise a titanium-based compound (see page 12, line 10).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of WO '287 vary the porosity across the plurality of layers of Fuglevand in addition to the hydrophobicity. At page 4, line 11, WO '287 teaches the following:

It has been discovered that the fuel cells of the fourth and fifth aspects of the invention as well as fuel cells prepared by the process of the sixth aspect of the invention are able to operate at a high current density at a relatively high voltage, have a relatively high power density, and provide a high power density even when operated under relatively low gas pressures.

As such, the artisan would be motivated by this disclosure to vary the porosity across the plurality of layers of Fuglevand. Further, it is noted that the reference teaches "at least two" portions with different mean pore sizes (e.g., page 3, line 26). This disclosure fairly suggests that the porous member may have more than two layers. As such, it would have been obvious to use a third support in the member in the fuel cell of Fuglevand, such support having a larger porosity than the second support (note teachings of increasing porosity on page 14, line 18 et seq. of WO '287). It is further noted that the duplication of parts is generally not considered to distinguish over a reference (MPEP §2144.04).



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7. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fuglevand in view of WO '287 as applied to claims 15, 22-25 and 51 above, and further in view of Wilson '586.

Fuglevand does not expressly teach that the porous supports comprise metal screens or sintered metal cloths, as recited in claims 16 and 17.

As noted above, Wilson '586 teaches or fairly suggests metal screens and sintered metal cloths as supports in porous members for fuel cells.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the structures of Wilson '586 in the fuel cell of Fuglevand. The disclosure of Wilson '586 indicates that metal screens and sintered metal cloths are functionally equivalent to carbon cloths when used in porous current-collecting members for fuel cells. As such, it would be obvious to substitute the metal screens or sintered metal cloths of Wilson '586 for the carbon paper of Fuglevand. An express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982); MPEP §2144.06.

### ***Response to Arguments***

8. Applicant's arguments filed June 6, 2005 have been fully considered but they are not persuasive. Regarding the rejection over Fuglevand in view of WO '287, Applicant assert that

“absent in the references themselves is the necessary teaching or suggestion that would have lead one of skill in the art to modify these references with any reasonable expectation of success at making Applicants’ claimed invention.” However, it is believed that such a teaching is found in the WO’287 reference, as set forth in the rejection above. As such, this ground of rejection is maintained.

### ***Conclusion***

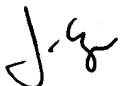
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr, can be reached at (571) 272-1414. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

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system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jonathan Crepeau  
Primary Examiner  
Art Unit 1746  
June 14, 2005